

# Report of the Third Meeting of the Southern Indian Ocean Fisheries Agreement (SIOFA) Scientific Committee (SC) Protected Areas and Ecosystems Working Group (PAEWG)

Held via online forum, Zoom videoconferences, and email  
correspondence on 1, 2 and 4 March 2021

*Items that were not addressed this year due to the reduced format and postponed to 2022 are in grey.*

## TABLE OF CONTENTS

<b>Agenda item 1 – Opening .....</b>	<b>4</b>
Agenda item 1.1 Opening statement from the Chair .....	4
Agenda item 1.2 Introduction of participants.....	4
Agenda item 1.3 PAEWG Chair and co-Chair .....	4
<b>Agenda item 2 – Administrative arrangements.....</b>	<b>4</b>
Agenda item 2.1 Adoption of the Agenda .....	4
Agenda item 2.2 Confirmation of meeting documents .....	4
Agenda item 2.3 Appointment of rapporteurs .....	4
Agenda item 2.4 Review of functions and terms of reference .....	4
Agenda item 2.5 Advice to the Scientific Committee .....	4
<b>Agenda item 3 – Vulnerable Marine Ecosystems (VME).....</b>	<b>4</b>
Agenda item 3.1 VME taxa list .....	4
Agenda item 3.2 VME encounter thresholds .....	5
Agenda item 3.3 VME mapping (ongoing consultancy from BOREA Laboratory, Biology of Aquatic Organisms and Ecosystems).....	6
Agenda item 3.4 Advice to the Scientific Committee .....	7
<b>Agenda item 4 – Bottom Fishing Impact Assessments (BFIA).....</b>	<b>8</b>
Agenda item 4.1 Trawl cumulative BFIA. Report of consultancy (Project PAE2020-01). 8	
Agenda item 4.2 Longline cumulative BFIA. Report of consultancy (Project PAE2020-01).....	8
Agenda item 4.3 Advice to the Scientific Committee .....	9
<b>Agenda item 5 – Protocols for interim Protected Areas and review the protected areas proposal in SIOFA.....</b>	<b>10</b>
<b>Agenda item 6 – Advice on management and/or research plans in the proposed and/or validated protected zones .....</b>	<b>10</b>
<b>Agenda item 7 – SIOFA fishing footprint.....</b>	<b>10</b>
Agenda item 7.1 Options for methods and objectives.....	10
Agenda item 7.2 Recommendations for Scientific Committee .....	12
<b>Agenda item 8 – Consideration of PAEWG work plan and resource requirements .....</b>	<b>13</b>
Agenda item 8.1 Work plan to realise the General Objectives relating to the 2020 EU Grant.....	13
Agenda item 8.2 Reinforcing the data collection, SIOFA data/bases systems, coding and data processes.....	13
Agenda item 8.3 Review and update of the Scientific Committee workplan.....	13
Agenda item 8.4 Advice to the Scientific Committee .....	14
<b>Agenda item 9 – Other business.....</b>	<b>14</b>

<b>Agenda item 10 – Future Meeting Arrangements .....</b>	<b>14</b>
<b>Agenda item 11 – Adoption of the meeting report.....</b>	<b>14</b>
<b>Agenda item 12 – Close of meeting .....</b>	<b>14</b>
<b>ANNEX A – List of participants .....</b>	<b>15</b>
<b>ANNEX B – AGENDA .....</b>	<b>17</b>
<b>ANNEX C – List of PAEWG3 meeting documents.....</b>	<b>19</b>
<b>ANNEX D – SIOFA VME taxa list .....</b>	<b>21</b>
<b>ANNEX E – PAEWG work plan .....</b>	<b>22</b>

## **Agenda item 1 – Opening**

### **Agenda item 1.1 Opening statement from the Chair**

1. The third meeting of the SIOFA SC Protected Areas and Ecosystems Working Group (PAEWG3) was opened by the Chair, Mr Patrice Pruvost of France (Territories), at 6:03 am (UTC) on 1 March 2021.
2. The Chair welcomed the participants to the meeting.

### **Agenda item 1.2 Introduction of participants**

3. The list of participants is attached (**Annex A**).

### **Agenda item 1.3 PAEWG Chair and co-Chair**

4. The Chair invited the PAEWG to nominate a co-Chair (new post) to serve alongside him. Interested persons are welcome to give their nominations to the Secretariat before Thursday, 4 March.

## **Agenda item 2 – Administrative arrangements**

### **Agenda item 2.1 Adoption of the Agenda**

5. The agenda was adopted via email in advance of the meeting (**Annex B**).

### **Agenda item 2.2 Confirmation of meeting documents**

6. The meeting documents (**Annex C**) were confirmed.

### **Agenda item 2.3 Appointment of rapporteurs**

7. Mr Alex Meyer (Urban Connections, Tokyo) was appointed as rapporteur with assistance from delegations.

### **Agenda item 2.4 Review of functions and terms of reference**

8. No changes to the functions and terms of reference of the PAEWG were proposed.

### **Agenda item 2.5 Advice to the Scientific Committee**

9. The PAEWG has no advice in relation to this agenda item.

## **Agenda item 3 – Vulnerable Marine Ecosystems (VME)**

### **Agenda item 3.1 VME taxa list**

#### Summary of paper

10. The PAEWG considered PAEWG-03-07, prepared by the Secretariat. This paper provided a draft SIOFA VME taxa list and guide, adapted from the Commission for the Conservation of Antarctic Marine Living Resources' (CCAMLR's) current taxa list, for use in the SIOFA Area with the support of CCAMLR.
11. Based on the paper, the Secretariat recommended that:
  - the PAEWG investigate other taxa that do not occur in the CCAMLR Area, including possible VME indicators in fishing grounds north of 45° south.

- the PAEWG and the SC adopt this VME taxa list for distribution to the fishing authorities and on-board bottom fishing vessels for improving VME taxa identification.

#### PAEWG discussion

12. The PAEWG **ENDORSED** the draft VME taxa list (**Annex D**) and **RECOMMENDS** that the SC adopt it for distribution to the fishing authorities and on-board bottom fishing vessels for improving VME taxa identification.
13. The PAEWG **NOTED** that the list has been adapted from that of CCAMLR and agreed on the need to investigate other taxa that do not occur in the CCAMLR Area, including possible VME indicators in fishing grounds in the SIOFA Area north of 45° south.
14. The PAEWG **AGREED** to update the list, if required, each year and **NOTED** the possibility of including VME taxa from the lists of other regional fisheries management organisations (RFMOs).
15. The DSCC suggested that particular attention be given to including rare species found within the SIOFA Area not listed on the CCAMLR list.
16. The PAEWG suggested the need for transparent and objective guidelines for the selection of VME taxa.

#### Agenda item 3.2 VME encounter thresholds

17. The PAEWG discussed ways to progress the work to set VME encounter thresholds for trawl gears.
18. The PAEWG reviewed the VME thresholds specified in each CCP's Bottom Fishing Impact Assessments (BFIA), as a possible basis for determining SIOFA VME encounter thresholds. Thailand reported that its thresholds have been changed from >60kg accidental catch of corals and >700kg accidental catch of sponges, at the time of PAEWG2, to >60kg and >300kg, respectively.
19. The EU reminded the PAEWG of the paper it had submitted to PAEWG1, PAEWG-01-16, which recommended conducting a comparative analysis of VME related measures adopted in other RFMOs and assessing their adequacy within SIOFA.
20. The PAEWG **NOTED** that it would be worthwhile to consider the thresholds, or the processes to agree thresholds, adopted by other RFMOs.
21. Australia suggested that the PAEWG consider the South Pacific Regional Fisheries Management Organisation (SPRFMO) working paper SC5-DW09, which describes methods for deriving thresholds for VME encounter protocols for SPRFMO bottom fisheries. Based on the options presented in that paper, Australia recommended setting VME indicator taxa weight thresholds using medians, percentiles, or other metrics based on historical SIOFA catch data.
22. The Cook Islands recognised the value of the methods described in SPRFMO SC5-DW09 but pointed out that the PAEWG previously noted that the setting of thresholds must be considered holistically, in the context of the full range of management measures, the SIOFA fishing footprint, and spatial habitat modelling (PAEWG2 Report, para 20). The Cook Islands suggested that the current thresholds should not be changed until an overall SIOFA BFIA has been conducted.
23. Australia recognised the value of the ongoing cumulative BFIA work and the need to consider the setting of thresholds holistically. However, Australia pointed out that it may take some time before the cumulative BFIA is completed and that

current conservation and management measure (CMM) 2019/01 (Interim Management of Bottom Fishing) relies on the current VME encounter thresholds. Australia noted that it is important to make advances on refining the thresholds in the short-term.

24. Deep Sea Conservation Coalition (DSCC) expressed concern about the current VME encounter threshold levels in light of the lack of information about many VME species in the SIOFA Area. DSCC pointed out the need to take a precautionary approach and suggested setting lower thresholds that can be adjusted once more data become available.
25. France (Territories) suggested that the PAEWG consider the SPRFMO working paper SC5-DW08 on utility of move on rules in CMMs to prevent significant adverse impacts of bottom fisheries on VMEs.
26. Japan pointed out that the spatial management methods adopted by SPRFMO are more effective when much VME information is available. However, VME information for the SIOFA Area is lacking and it is therefore premature to introduce such spatial management.

### **Agenda item 3.3 VME mapping (ongoing consultancy from BOREA Laboratory, Biology of Aquatic Organisms and Ecosystems)**

#### Summary of paper

27. The consultant, BOREA Laboratory, Biology of Aquatic Organisms and Ecosystems, Muséum national d'histoire naturelle, presented PAEWG-03-06, which describes the progress of the ongoing project to map bioregions based on VME indicator taxa distribution data. There are three main steps in this process: 1. provide maps of observed bioregions based on the observed distribution of VME indicator taxa, 2. provide predictive bioregions based on the individual modelled distributions of VME indicator taxa, and 3. provide an alternative set of predictive bioregions based on the modelled relationship between observed bioregions and the environment.
28. VME indicator taxa data have been collected and collated from various publicly available repositories and that of the SIOFA Secretariat, as well as publicly available data on environmental variables. The accuracy of these data have been investigated. The completeness index has also been calculated (observed richness/theoretical richness) to understand how under-sampled the SIOFA Area might be. Ensemble modelling will be applied to account for unspecified uncertainties.
29. The results are as follows:
  - The majority of the records occurred above 1,000 m water depth, reflecting the aggregated distribution of records in coastal areas.
  - Large areas of scant information dominated the centre of the SIOFA Area.
  - The spatial distribution of the completeness index suggested that the SIOFA Area is critically under-sampled, with only 63% of the species richness of the area currently known.
30. So far, the following can be concluded:
  - There are few distribution data for VME indicator taxa within the SIOFA Area.
  - Data held by the SIOFA Secretariat are at a very coarse taxonomic level.
  - More data are needed from largely “blank” areas and could come from research institute databases or published literature. The Consultant asked

the participants to communicate any other known data sources that could be used to improve the data quantity for the study.

- In the full study, data from outside the SIOFA Area will also be used to account for ecological continuity and calibration of the models.
- Further assessment of both taxonomic and spatial resolution for the predictive models is needed.

#### PAEWG discussion

31. The PAEWG **NOTED** the ongoing work by the consultant and supported the direction and the analytical approaches that were being applied in this work.
32. The PAEWG discussed the lack of VME distribution data available for the SIOFA Area and the coarse taxonomic resolution of the data that are available. The PAEWG recognised that spatial predictions done with inadequate data can result in misleading distributions. As a means of improving the quality of data collected, the PAEWG discussed the practice employed by France (Territories) of having scientific observers take samples and photos of VME bycatch for subsequent identification by a specialist. The PAEWG also discussed the potential usefulness of conducting an independent survey that could validate the spatial predictions and collect new datasets from unexplored seamounts but recognised that such a survey would be costly.
33. The PAEWG noted that the under-sampled nature of the SIOFA Area reflects the large size of the Area and the small size of the areas where fisheries are operated. This effect should be accounted for in the ongoing analysis.

#### Agenda item 3.4 Advice to the Scientific Committee

##### 34. The PAEWG's summary of advice to the SC is:

VME taxa list:

- The PAEWG **ENDORSED** the draft VME taxa list (**Annex D**) and **RECOMMENDS** that the SC adopt it for distribution to the fishing authorities and on-board bottom fishing vessels for improving VME taxa identification.
- The PAEWG **NOTED** that the list has been adapted from that of CCAMLR and agreed on the need to investigate other taxa that do not occur in the CCAMLR Area, including possible VME indicators in fishing grounds in the SIOFA Area north of 45° south.
- The PAEWG **AGREED** to update the list, if required, each year, and **NOTED** the possibility of including VME taxa from the lists of other RFMOs.

VME encounter thresholds:

- The PAEWG **NOTED** that it would be worthwhile to consider the thresholds, or the processes to agree thresholds, adopted by other RFMOs.

VME mapping:

- The PAEWG **NOTED** the ongoing work by the consultancy project to map bioregions based on VME indicator taxa distribution data.

## **Agenda item 4 – Bottom Fishing Impact Assessments (BFIA)**

### **Agenda item 4.1 Trawl cumulative BFIA. Report of consultancy (Project PAE2020-01).**

### **Agenda item 4.2 Longline cumulative BFIA. Report of consultancy (Project PAE2020-01).**

#### Summary of paper

35. The consultant, Dr Sophie Mormede, presented PAEWG-03-08, the draft report on work on Project PAE2020-01, to develop a BFIA for trawl and longline gears in SIOFA, using methodology akin to Sharp & Mormede (2017) and the finest spatial and temporal scale possible.
36. The data were provided by the Secretariat and the assumptions used were:
  - Cell size: 1 degree (trawls); 20' (longlines);
  - Resolution of analysis: Haul by haul and aggregated (trawls and longlines)
  - Location offset: No (trawls and longlines)
  - Missing location: 1.1% (trawls); 2.9% (longlines)
  - Missing haul lengths: 1km or 5km (trawls); 8km (longlines)
  - Midwater trawls: Assumed to be 20% of length of bottom trawls
  - Vertical longlines: Excluded
  - Maximum tow length: 70km (trawls); 25km (longlines)
  - Overlap: In impact calculation within cell (trawls and longlines)
  - Sensitivity of VME: 0.67 (trawls); 0.27 (longlines)
  - Recovery of VME: 0.20 (trawls and longlines)
  - Steepness (stock-recruit relationship): 0.9 (trawls and longlines)
37. The mapped trawl footprint over time (cells of 1 degree) indicates that the footprint is still expanding. The mapped longline footprint over time (cells of 20') indicates that the footprint is still expanding but at a slower rate than the trawl footprint.
38. Sensitivity analyses show that the assumptions with the most impact were cell size, fishable depths, no VME recovery, and reduced steepness of the stock-recruit relationship, while those with the least impact were halving trawl width, fixing tow length at 1km, removing midwater trawls, and reducing VME sensitivity.
39. Based on the paper, the consultant recommended:
  - That fine-scale location data be made available prior to updating this analysis.
  - That the bottom impact of trawl and longline gear be recalculated at fine scale with a range of parameters combining trawl and longline impacts, for a range of VMEs.
  - That the actual population status of a range of VMEs be calculated once spatial distribution maps are available.
  - That all future fishing effort be recorded on a haul-by-haul basis, including start and end positions, distance trawled, trawl width and longline length.

#### PAEWG discussion



40. As additional reference materials, the consultant drew the PAEWG's attention to two SPRFMO documents: SC5-DW06 (Methods development for spatially-explicit bottom fishing impact evaluation within SPRFMO: 1. Fishery footprint estimation) and SPRFMO SCW3 – Doc17 (Assessing bottom fishery impact using a CCAMLR-style method).
41. The PAEWG **NOTED** the ongoing work to develop a BFIA for trawl and longline gears in SIOFA.
42. The PAEWG **ENDORSED** the recommendations in PAEWG-03-08.
43. The PAEWG **NOTED** the importance of using finer-scale location data while recognising that some CCPs have not collected or provided such data.
44. The PAEWG **NOTED** that the work done so far shows that the trawl and longline footprints are expanding.
45. The PAEWG discussed that this expansion could be due to the addition of data from CCPs that newly acceded to SIOFA in the later years of the study period, as well as the limited availability of historical fishing data.

#### **Agenda item 4.3 Advice to the Scientific Committee**

46. The PAEWG's summary of advice to the SC is:
  - The PAEWG **NOTED** the ongoing work to develop a BFIA for trawl and longline gears in SIOFA.
  - The PAEWG **RECOMMENDS** that fine-scale location data be made available prior to updating the ongoing trawl and longline BFIA analyses.
  - The PAEWG **RECOMMENDS** that the bottom impact of trawl and longline gear be recalculated at fine scale with a range of parameters combining trawl and longline impacts, for a range of VMEs.
  - The PAEWG **RECOMMENDS** that an attempt be made to calculate the actual population status of a range of VMEs once spatial distribution maps are available.
  - The PAEWG **RECOMMENDS** that all future fishing effort be recorded on a haul-by-haul basis, including start and end positions, distance trawled, trawl width and longline length.
  - The PAEWG **NOTED** the importance of using finer-scale location data while recognising that some CCPs have not collected such data.
  - The PAEWG **NOTED** that the work done so far shows that the trawl and longline footprints are expanding.
  - The PAEWG **NOTED** that this expansion could be due to the addition of data from CCPs that newly acceded to SIOFA in the later years of the study period, as well as the limited availability of historical fishing data.

## **Agenda item 5 – Protocols for interim Protected Areas and review the protected areas proposal in SIOFA**

## **Agenda item 6 – Advice on management and/or research plans in the proposed and/or validated protected zones**

## **Agenda item 7 – SIOFA fishing footprint**

### **Agenda item 7.1 Options for methods and objectives**

#### Summary of paper

47. The Secretariat presented PAEWG-03-05, which described four new sets of SIOFA fishing footprints (SFFPs): fishing footprints by CCP, fishing footprints by main gear (TW-trawl, LI-lines and OTH-others), complete SIOFA fishing footprint at 20' grid resolution from fine resolution data, and complete SFFP excluding deeper areas (> 2,000m).
48. In accordance with SIOFA CMM 2019/01 (Interim Management of Bottom Fishing), the Secretariat had presented SFFPs to PAEWG2 and SC5. SC5 requested that the MoP provide information on the usage of the SFFP to help in selecting the most appropriate SFFP, but some of the MoP did not provide such information. In the absence of further guidance from the MoP, the PAEWG Chair requested that the Secretariat develop SFFPs with a 20-minute-resolution grid using only data provided at fine resolution (up to 20-minute resolution).
49. The data used are from the Secretariat's haul-by-haul catch and effort database and aggregate catch and effort database. Historical data up to and including 2015 were used. Data with a coarser resolution than 20 minutes were excluded. Only data for gears that may have contact with the sea floor have been used. The historical fishing activities of China, Japan, Korea, Mauritius, and Thailand are not included in the SFFPs because the data are either unavailable or at an insufficiently fine resolution. A 20-minute-square grid has been used to project the fishing event points, with squares being extracted from the full grid where at least one fishing event is in or at the edge of a 20-minute cell. A depth threshold of 2,000m has been chosen to be consistent with the depths used in footprint calculations by Contracting Parties (e.g., Delegation of Australia 2020), which reduced the estimated size of the footprint considerably but also erroneously excluded many areas where activities occurred on seamounts or small banks driven by the resolution of the bathymetry model of 1 minute.
50. The Secretariat also estimated additional footprints using the coarser resolutions than the 20-minute square for reference.
51. The Secretariat recommended that the SC provide the MoP with an SFFP that would serve as a starting point for defining the historical spatial extent of the SIOFA fisheries.

#### PAEWG discussion

52. The PAEWG considered the footprints prepared by the Secretariat and discussed other possible parameters. The Secretariat requested CCPs to provide it with

finalised suggestions for new footprint parameters, based on which it will present updated footprint maps to SC6.

53. Korea indicated that, in addition to the aggregated data it has already submitted, it is currently verifying catch and effort data with at least 10' resolution for longline and trawl fisheries for 2009 to 2013 and will submit those data to the Secretariat in the near future.
54. Thailand indicated that it can provide finer resolution data (trawl-by-trawl) for its bottom trawl fishery on Saya de Malha Bank for 2015 to 2017 to the Secretariat.

#### Summary of paper

55. Japan presented PAEWG-03-09, which provides Japan's comments on the purposes of the SIOFA bottom fishing footprint and the framework for scientific research. Japan believes that the primary purpose of the footprint is to identify the spatial extent of existing fishing grounds, and that the primary purpose of the framework for scientific research is to define the footprint (existing fishing grounds) and thereby identify new fishing grounds, so that research activities such as BFIA for both existing and new fishing grounds (framework) duly take into account the different nature of VMEs distributed in them.
56. To accomplish these purposes, Japan requests the SC to consider the following points.
  - Regarding the bottom fishing footprint, the SC should:
    - i. adopt the definition of the footprint with a spatial resolution by  $1^{\circ} \times 1^{\circ}$  including finer resolutions, in order to utilise maximum available historical fishing effort from the majority of CCPs;
    - ii. provide a composite (common) footprint including all types of gears from the viewpoint of practicality; and
    - iii. use all fishing effort data with no depth constraints in order to make the footprint practical.
  - Regarding the framework for scientific research, the SC should:
    - i. adopt the definition of the SIOFA bottom fishing footprint to identify the spatial extent of existing fishing grounds, so that the new fishing grounds (outside of the existing fishing grounds) are clearly defined;
    - ii. consider that the framework is defined as these two areas (existing (up to 2015) and new fishing area), so that scientific research activities (fishing surveys, exploratory fishing, BFIA and other associated activities) can be implemented differently and meaningfully under this framework; and
    - iii. establish the criteria to categorise new fishing grounds as established fishing grounds (SEAFO-CM30/15), as one of the abovementioned associated activities.

#### PAEWG discussion

57. The PAEWG discussed possible applications of the bottom fishing footprints as a fisheries management tool. The PAEWG **NOTED** that they should be used to define the spatial extent of bottom fishing grounds to prevent any expansion of such fishing activities in accordance with SIOFA CMM 2019/01 and 2020/01 (Interim Management of Bottom Fishing), and to define areas that represent "new and exploratory" fishing that may be subject to additional management controls and trigger the need for new research and data collection. For these

management purposes, fishing footprints are fixed to a historical fishing period and not continuously updated and it is desirable that they reflect the best-available spatial resolution. New and exploratory fisheries are to be defined by the SC.

58. The PAEWG discussed possible applications of the bottom fishing footprints and fisheries mapping for scientific purposes. The PAEWG **NOTED** that best-available resolution fisheries effort mapping (providing both the extent of fishing and level of effort within a cell) are an essential component for assessing the impact of bottom fishing on VMEs, notably using best-practice methods such as Relative Benthic Status; and that best-resolution footprints are useful in a class of spatial stock assessment or risk assessment that use “overlap of the fishery area with the species habitat area” as a foundation for estimation (e.g., Sustainability Assessment for Fishing Effects). For these science purposes, fishing footprints and fisheries effort mapping are continuously updated to the most recent fishing year.

#### **Agenda item 7.2 Recommendations for Scientific Committee**

59. The PAEWG’s summary of advice to the SC is:
- The PAEWG **REQUESTED** the Secretariat to provide updated bottom fishing footprint maps to SC6 based on 20-minute and 1-degree resolutions (all gears and all depths aggregated).
  - The PAEWG **NOTED** the possible applications of the bottom fishing footprints as a fisheries management tool:
    - i. to define the spatial extent of bottom fishing grounds to historically fished areas to prevent any expansion of such fishing activities in accordance with SIOFA CMM 2019/01 and 2020/01 (Interim Management of Bottom Fishing); and
    - ii. to define areas that represent “new and exploratory” fishing that may be subject to additional management controls and trigger the need for new research and data collection.
  - The PAEWG **NOTED** that, for the abovementioned management purposes, fishing footprints are fixed to a historical fishing period and not continuously updated and it is desirable that they reflect the best-available spatial resolution.
  - The PAEWG **NOTED** the possible applications of the bottom fishing footprints and fisheries mapping for scientific purposes:
    - i. Best-available resolution fisheries effort mapping (providing both the extent of fishing and level of effort within a cell) are an essential component for assessing the impact of bottom fishing on VMEs, notably using best-practice methods such as Relative Benthic Status.
    - ii. Best-resolution footprints are useful in a class of spatial stock assessment or risk assessment that use “overlap of the fishery area with the species habitat area” as a foundation for estimation (e.g. Sustainability Assessment for Fishing Effects).
  - The PAEWG **NOTED** that, for the abovementioned science purposes, fishing footprints and fisheries effort mapping are continuously updated to the most recent fishing year.

## **Agenda item 8 – Consideration of PAEWG work plan and resource requirements**

### **Agenda item 8.1 Work plan to realise the General Objectives relating to the 2020 EU Grant**

#### **Agenda item 8.1.1 Report of the consultancy to coordinate, plan, and assist implementation of science consultancies to support the SIOFA scientific working plan (Project SCM2021-01)**

#### **Agenda item 8.2 Reinforcing the data collection, SIOFA data/bases systems, coding and data processes**

60. The PAEWG considered the EU Grant provided to SIOFA and the General Objectives of relevance to the PAEWG.
  - i. Investigation of a holistic framework for assessing and preventing SAIs on VMEs
  - ii. Support work on benthic bioregionalisation (underway) and (future) investigate possible habitat suitability modelling
  - iii. Investigation of representative protected areas (relevant to the bioregionalisation work)

#### **Agenda item 8.3 Review and update of the Scientific Committee workplan**

61. The PAEWG reviewed the SC workplan and the tasks relevant to PAEWG, and recognised the progress being made by the ongoing VME mapping and trawl and longline BFIA consultancies (SC05 report annex I).
  - i. Mapping of areas where VMEs are known or likely to occur. Work plan for taxa habitat mapping: Ongoing consultancy work.
  - ii. Bioregionalisation of the SIOFA area using a spatial analysis approach.
  - iii. Consider benthic sampling protocols for mapping distribution of VME indicator species and predicting benthic community structure.
  - iv. Cumulative impact assessment of SIOFA fisheries: Ongoing consultancy work.
  - v. Consider proposals for protected areas against the Standard protocol: No new proposal
  - vi. Review of trawl fisheries threshold levels for VME encounters: Discussed during the working group
  - vii. Spatial extent of historical and current fishing: Discussed during the working group
62. The PAEWG discussed the importance of ensuring close coordination between the ongoing VME mapping and BFIA work, as well as the future bioregionalisation work. The PAEWG recognised that the respective consultants have already begun such coordination.
63. The PAEWG discussed potential future work to supplement and validate the ongoing VME mapping work. Regarding the possibility of conducting independent VME surveys, the PAEWG recognised that such surveys could provide useful information about VME distributions, if conducted at a scale that is representative of the populations under investigation, but would be expensive, unless undertaken in collaboration with large international projects such as the EAF-Nansen Programme or the Areas Beyond National Jurisdiction Deep-Sea Fisheries Project. As alternatives, the PAEWG considered the possibility of

conducting sampling programs from existing platforms such as commercial vessels operating in the area.

64. The PAEWG drafted an updated PAEWG work plan (**Annex E**).

**Agenda item 8.4 Advice to the Scientific Committee**

65. The PAEWG **RECOMMENDS** that the SC take the updated PAEWG work plan (**Annex E**) into consideration when updating the SC workplan.

**Agenda item 9 – Other business**

66. No other business was raised.

**Agenda item 10 – Future Meeting Arrangements**

67. The PAEWG **REQUESTS** the SC to consider future meeting arrangements in conjunction with arrangements for SC7.

**Agenda item 11 – Adoption of the meeting report**

68. The report of the 3<sup>rd</sup> meeting of the SIOFA PAEWG was adopted at 07:15 am (UTC), 4 March 2021.

**Agenda item 12 – Close of meeting**

69. The meeting was closed at 07:18 am (UTC), 4 March 2021.

## ANNEX A – List of participants

Delegation	Title	Name	Function	Contact
<b>MEETING CHAIRPERSON</b>				
	Mr	Patrice Pruvost	PAEWG Chairperson	
<b>SIOFA CCPs</b>				
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## ANNEX B – AGENDA

Provisional Agenda for the Third Meeting of the Protected Areas and Ecosystems Working Group (PAEWG3)

Co-Chairs: Dr Patrice Pruvost and Vacant

**Red:** High priority, must be treated in session, by correspondence and video conference

**Black:** Urgent, may be treated in session or by correspondence depending on time

**Grey:** Will be not be addressed this year due to the reduced format and postponed to 2022

1. Opening
  - 1.1 **Opening statement from the Chair**
  - 1.2 Introduction of participants
  - 1.3 PAEWG Chair and co-Chair
  
2. Administrative arrangements
  - 2.1 **Adoption of the agenda**
  - 2.2 **Confirmation of meeting documents**
  - 2.3 **Appointment of rapporteurs**
  - 2.4 Review of the PAEWG functions and terms of reference
  - 2.5 **Advice to the Scientific Committee**
  
3. Vulnerable Marine Ecosystems (VME)
  - 3.1 VME taxa list
  - 3.2 **VME encounter thresholds (WG report)**
  - 3.3 **VME mapping (ongoing consultancy from BOREA Laboratory, Biology of Aquatic Organisms and Ecosystems)**
  - 3.4 **Advice to the Scientific Committee**
  
4. Bottom Fishing Impact Assessments (BFIA)
  - 4.1 **Trawl cumulative BFIA. Report of consultancy (Project PAE2020-01).**
  - 4.2 **Longline cumulative BFIA. Report of consultancy (Project PAE2020-01).**
  - 4.3 **Advice to the Scientific Committee**
  
5. Protocols for interim Protected Areas and review the protected areas proposal in SIOFA.
  
6. Advice on management and/or research plans in the proposed and/or validated protected zones
  
7. SIOFA Fishing footprint
  - 7.1 **Options for methods and objectives**  
*Consideration of the MoP7 request to prepare a paper outlining the options for different methodologies of different gear types and objectives as well as options for addressing the pending technical issues and associated consequences/trade-offs to facilitate discussions of the MoP8*
  - 7.2 Recommendations for Scientific Committee
  
8. Consideration of PAEWG work plan and resource requirements
  - 8.1 **Work plan to realise the General Objectives relating to the 2020 EU Grant**

- 8.1.1 Report of the consultancy to coordinate, plan, and assist implementation of science consultancies to support the SIOFA scientific working plan (Project SCM2021-01)
- 8.2 Reinforcing the data collection, SIOFA data/bases systems, coding and data processes
- 8.3 Review and update of the Scientific Committee workplan
- 8.4 Advice to the Scientific Committee
  
- 9. Other business
- 10. Future Meeting Arrangements
- 11. Adoption of the meeting report
- 12. Close of meeting

## ANNEX C – List of PAEWG3 meeting documents
















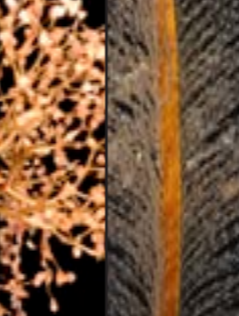
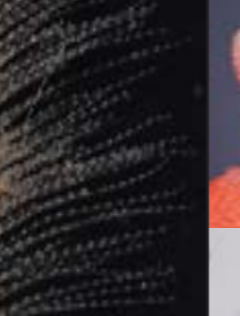




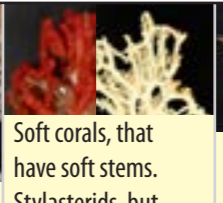
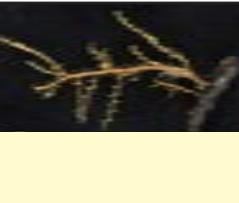


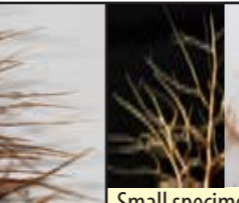
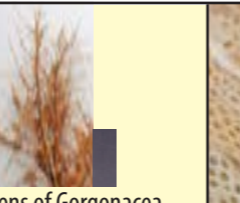



Agenda Item	Related Papers
1. Opening  1.1 Opening statement from the Chair 1.2 Introduction of participants 1.3 PAEWG chair and co-chair	
2. Administrative Arrangements  2.1 Adoption of the agenda 2.2 Confirmation of meeting documents  2.3 Appointment of rapporteurs 2.4 Review of functions and terms of reference 2.5. Advice to the Scientific Committee	PAEWG-03-01 Provisional Agenda PAEWG-03-03 Table of agenda items and related papers (this) PAEWG 03-04 List of participants
3. Vulnerable Marine Ecosystem  3.1 VME taxa list  3.2. VME encounter thresholds (WG report)  3.3. VME mapping  3.4. Advice to the Scientific Committee	PAEWG-03-INFO-01 FAO DSF Project  PAEWG-03-07 SIOFA VME taxa guide v.0.1  PAEWG-03-06 VME Mapping (Consultant report)
4. Bottom Fishing Impact Assessment 4.1. Trawl Cumulative BFIA 4.2. Longline Cumulative BFIA  4.3. Advice to the Scientific Committee	PAEWG-03-INFO-01 FAO DSF Project  PAEWG-03-08 SIOFA BFIA draft report (Mormede) rev1 (Project PAE2020-01)
5. Protocols for interim Protected Areas and review the protected areas proposal in SIOFA	not prioritized
6. Advice on management and/or research plans in the proposed and/or validated protected zones	not prioritized
7. SIOFA fishing footprint  7.1. Options for methods and objectives  7.2. Recommendations to the SC	PAEWG-03-INFO-01 FAO DSF Project  PAEWG-03-05 SIOFA Fishing Footprint PAEWG-03-09 Japan's comments on footprint and scientific research

<p>8. Consideration of PAEWG workplan and resource requirements</p> <p>8.1. Work plan to realise the General Objectives relating to the 2020 EU Grant</p> <p>8.1.1 Report of the consultancy to coordinate, plan, and assist implementation of science consultancies to support the SIOFA scientific working plan (Project SCM2021-01)</p> <p>8.2 Reinforcing the data collection, SIOFA data/bases systems, coding and data processes</p> <p>8.3 Review and update of the Scientific Committee workplan</p> <p>8.4 Advice to the Scientific Committee</p>	
<p>9. Other Business</p>	
<p>10. Future meeting arrangements</p>	
<p>11. Adoption of the meeting report</p>	
<p>12. Close of meeting</p>	

## **ANNEX D – SIOFA VME taxa list**








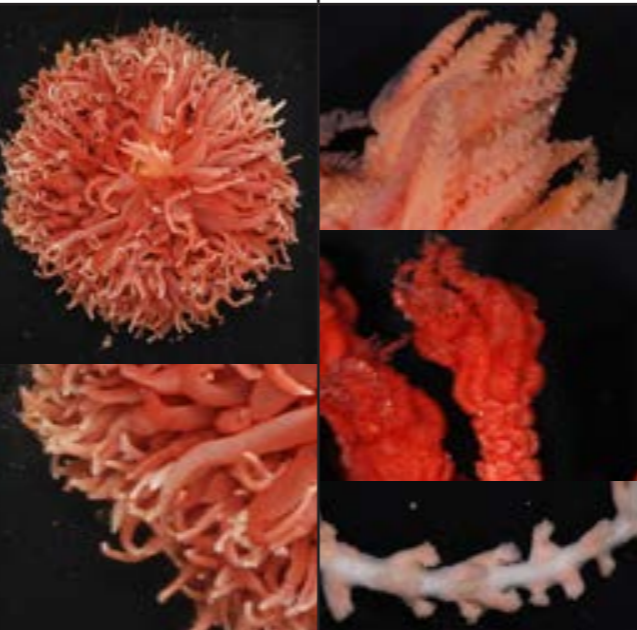





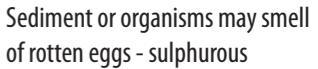


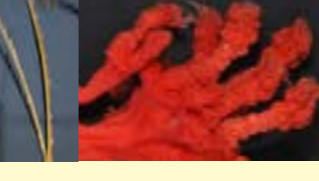

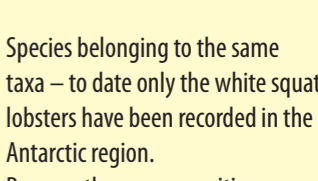
# SIOFA VME Taxa Classification Guide 2021

These groups are **not** included   

Phylum	Cnidaria (CNI)									
Code	GGW					HQZ	AXT	CSS	AQZ	ZOT
Level	Gorgonacea (Order)					Hyroidolina (Order)	Anthoathecatae (Family)	Scleractinia (Order)	Antipatharia (Order)	Zoantharia (Order)
Taxon	Isididae (Bamboo)	Coralliidae (Red / precious)	Primnoidae (Bottle brush, sea fans)	Paragorgiidae (Bubblegum)	Chrysogorgiidae (Golden)	Hydroids	Stylasterids (Hydrocorals)	Stony corals	Black corals	Zoanthids
<b>Form, size</b>	 Solid calcified trunk with brown joints (nodes), rings in x-section, branching 2D or 3D, fine tips, tree like branch tips	 Calcified skeleton, no spines. Thick, stubby stems with fine side branches	 Dark or metallic tree-like branches, flexible	 Large (up to 2 m), red, thick stems, breaks when flexed	 Gold, black or green metallic lustre. Semi-rigid, single, main axis with semi-soft tissue cortex. Small specimens can be feathery like hydroids or bushy like black coral	 Entire organism small, <30 cm, flexible and plant-like, often feathery, no soft tissue covering	 Calcified, no rings in X-section, often pink or white. Often uniplanar, side branches lattice from obviously thicker main stems	 Cups: usually small (<20cm), solitary or in small clusters Branching matrix-forming stony corals have not been observed south of 56°S	 Semi-rigid, woody, not very dense, dark brown or black skeleton, can be large (>2 m). Branch tips can look like hydroids or small gorgonian	 Erect "coral-like" colonies. Often grow on, or colonise, other living corals.
<b>Detail (texture, colour, polyps)</b>	 Can scrape off surface tissue, skeleton surface smooth between nodes	 Can scrape off surface tissue. Smooth (not sandpaper) with knobby ends. No pores on skeleton	 Usually no spines, some metallic lustre on skeleton, 3D bushy branches, obvious polyps	 Chalky material, not hard. No spines, can scrape off surface. Bulbous ends with polyps	 Can be non-branching and whip-like. Usually no spines, metallic lustre. Fine or sparse 3D branching	 Indistinct polyps, feathery tips	 Coarse sandpaper texture, can't scrape off surface tissue. Has minute pores. Can be white or red	 Calcified, very hard or brittle Cups: Can be ridged Branching: Often smooth stems. Can form a 3D matrix. Polyp calyces well formed with ridged edges, large, hard polyps	 Slimy flesh on branches. Surface with minute spines, may appear smooth. 3D, fine or bushy tips	 Large roundish polyps; often bright orange.
<b>Commonly mistaken for other groups, such as:</b>	 Other gorgonians if in small pieces, but won't break easily	 Soft corals, that have soft stems. Stylasterids, but Coralliidae have nodules	 Hydroids if small pieces, but have distinct polyps	 Pieces of Corallium	 Antipatharia, but tips are not slimy	 Small specimens of Gorgonacea, Antipatharia, or carnivorous sponges	 Small, hard bryozoans or pieces of Coralliidae	 Pieces of hydrocorals and <i>Corallium</i> can be confused with branching stony corals	 Hydroid if small, or small pieces of dead Gorgonacea	 Large brooding gorgonian coral polyps; branching soft corals


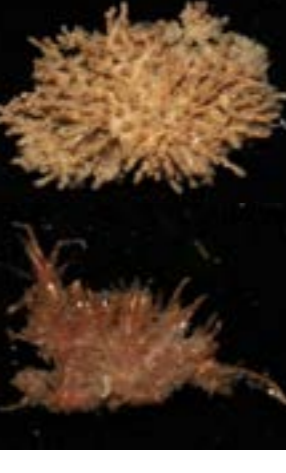

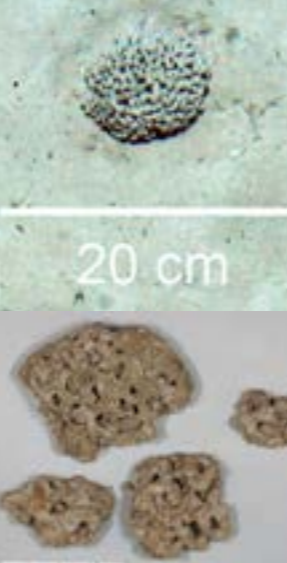



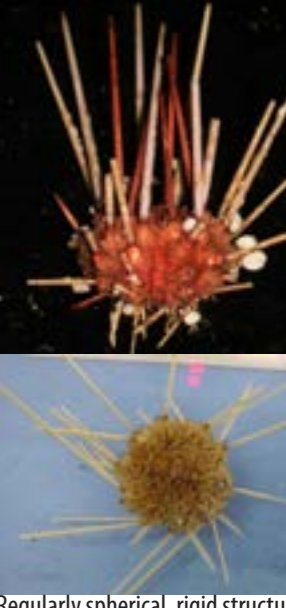















# SIOFA VME Taxa Classification Guide 2021

These groups are **not** included   

Phylum	Porifera (PFR)		Cnidaria (CNI)			Chordata (CZR)	Bryozoan	Chemosynthetic		
Code	HXY	SPO	ATX	AJZ	NTW	SSX	BZN	CXY		
Level	Hexactinellida (Class)		Actiniaria (Order)			Ascidiacea (Class)		Bryozoans (Phylum)		
Taxon	Glass sponges		Anemones			Sea squirts		Lace corals		
Taxon	Siliceous sponges		Soft corals			Sea squirts		Lace corals		
Taxon	Siliceous sponges		Sea pens			Sea squirts		Lace corals		
<b>Form, size</b>	 <p>Diverse shapes: hollow central chamber spiky &amp; vase-like, egg-shaped with hairy mass at base, honeycombed tubular crystalline forms</p>		 <p>Rubbery bottom with single polyp with lots of tentacles. Usually in retracted hardened cylinder form when captured</p>			 <p>Feather-shaped with fleshy polyps. Non-branching to whip-like cartilaginous stalk. Fleshy foot or anchor present, body symmetrical. Can be tall, &gt;1 m</p>		 <p>Typically small, (&lt;30 cm). Variable forms. Can be hard or soft (most commonly hard) branching, lace-like, or cornflake shaped, calcified, and brittle, surface cannot be scraped off</p>		 <p>White squat lobster</p>  <p>Mud shrimp</p>
<b>Detail (texture, colour, polyps)</b>	 <p>Surface frequently spiny, always very siliceous or like fibre-glass, ice-like, delicate, crunchy</p>		 <p>Tentacles sometimes look like worms when detached</p>			 <p>Regularly spaced surface pores.</p>		 <p>No polyps</p>		 <p>Mussels and clams</p>  <p>Tubeworms</p>  <p>Flatfish</p>  <p>Eel pout</p>
<b>Commonly mistaken for other indicator groups, such as:</b>	 <p>Bryozoans or scleractinians that are small and of a hard matrix</p>		 <p>Alcyonaceans, which usually have several polyps</p>			 <p>Alcyonaceans or some gorgonians due to large polyps and size</p>		 <p>Spherical demosponges or piece of sea pen</p>		 <p>Species belonging to the same taxa – to date only the white squat lobsters have been recorded in the Antarctic region. Because these communities are little known, <b>retain samples to be identified by experts</b></p>

# SIOFA VME Taxa Classification Guide 2021

These groups are **not** included   

Phylum	Brachiopoda	Hemichordata (HET)	Annelida (ANH)	Xenophyophora	Arthropoda (AXX)	Echinodermata (ECH)		
Code	BRQ	PYZ	SSY	XEN	BCD	CXX	OOY	CCH
Level	Brachiopoda (Phylum)	Pterobranchia (Class)	Serpulidae (Family)	Xenophyophora (Phylum)	Bathylasmatidae (Family)	Stalked crinoid (Orders)	Ophiurida (Order)	Cidaroida (Order)
Taxon	Lamp shells	Acorn worms	Serpulid tube worms	Xenophyophores	Goose and acorn barnacles	Stalked crinoids (Sea lilies)	Basket and snake stars	Pencil spine urchins
Form, size	 <p>Valves enclose the body dorsally and ventrally rather than laterally. Ventral valve typically larger than the dorsal. Attached species have a short stalk emerging from the hinge area of the valves</p>	 <p>Tubes conjoined into colonies. Usually gelatinous, often semi-transparent</p>	 <p>Tube dwelling marine worms. Each tube flange is about 3.5 mm diameter. Forms large clumps, somewhat coral-like, typically Subantarctic distribution</p>	 <p>A specialised group, is among the largest single-celled protozoans. Colony size can be 10-20 cm in diameter</p>	 <p>These are stalked (goose barnacles) and non-stalked (acorn barnacles)</p>	 <p>Stalked. Small tulip-like body. Arms usually branched. Crinoids are generally fragile, often only fragments. A long stalk, some bearing whorls of hooklike cirri. Body length up to 20 cm</p>	 <p>Large disc with 5-6 arms splitting at the disc into many coiled branches</p>	 <p>Regularly spherical, rigid structure, typically 2-10 cm in diameter. Covered with small spines and 10 distinct columns of large pencil-like spines</p>
Detail (texture, colour, polyps)	 <p>Delicate shell; clam like. Each valve is bilaterally symmetrical and may be ornamented with concentric growth lines and a fluted or spiny surface</p>	 <p>Red-orange to brown. Tubes closely or loosely bound</p>	 <p>Serpulid worms in hard calcareous tubes</p>	 <p>Varied appearance ranging from spherical to flat. Many species have a rounded, lumpy form and irregular netlike surface structure. Most are fragile but one group is felt-like &amp; robust. Found &gt;500 m</p>	 <p>The mantle surface of any barnacle bears at least 5 major plates, which are pulled together for protection. Heavily armoured</p>	 <p>Fragile, not flexible. Brittle and segmented</p>	 <p>Distinguished from other sea stars by branched or highly coiled arms and lack of ventral groove on underside of arms</p>	 <p>Usually shades of beige, burgundy or purple. Spines paler, they can be a substrate for other organisms. Large spines can be cylindrical or flattened</p>
Commonly mistaken for other indicator groups, such as:	<p>Resemble bivalve molluscs but one valve is much larger, and overhangs the smaller valve</p>	 <p>Algae, marine tube worms, tunicates or demosponges</p>	 <p>Other worm like forms in sediment tubes</p>	 <p>Fragments of demosponges sponges (see image), colonial ascidians, bryozoans, or 'inorganic concretions'</p>	 <p>Cup corals or clusters of tube worm casings</p>	 <p>Arm fragments can look like other animals such as basketstars, or feather stars if stalk not present</p>	 <p>Other sea stars with multiple or coiled arms and more common forms with non-branching arms</p>	 <p>Urchins that lack the large pencil-like spines</p>



# SIOFA VME Taxa Classification Guide

*Conservation and Management Measure 2019/01 requires vessels to monitor bycatch for the presence of vulnerable marine ecosystem (VME) taxa as defined by the Agreement.*

*The level of classification required is relatively coarse for most taxa, where phylum, class or order is sufficient. However, some groups may require classification to family or even species. In addition, several groups can be confused at first sight. Therefore, a classification guide is needed to assist in the rapid and efficient classification of VME taxa.*

## Instructions

This SIOFA VME Taxa Classification Guide provides observers, fishers, and biologists at sea with a taxon-specific, quick, on-deck guide to aid in the classification of macroscopic marine invertebrate bycatch into the required VME groupings. VME taxa are a subset of the total invertebrate taxa encountered as fishery bycatch, and therefore additional processes are still required to collect information on non-VME taxonomic groups. Typically, invertebrate identification is not done at sea because it requires specialised tools. The format of the VME guide is a “compare and contrast table”, using photographs and key characteristics to correctly assign VME taxa to the appropriate grouping. It also highlights commonly confused groups. Symbols representing non-VME groups are listed in the top right-hand margin.

The guide is organised into columns, each describing a taxonomic group and colour coded by phylum. Those groups that appear similar have been placed next to each other where possible. The top row for each column is a parent column that identifies the phylum for the vulnerable groups below. The FAO 3-letter taxonomic code for each group is provided at the top of each column and for the parent group. Below the codes are the scientific and common names for each group. The first row contains photographs and brief descriptions of the overall size and shape of specimens for each group. The next row then provides details of the specimen’s appearance, such as texture, colour, or polyp characteristics, and also includes close-up images as examples. A final row (with a yellow background) has images and descriptions of specimens representing other phyla. This row shows how these specimens can be commonly mistaken for other taxa and flags details on what to look out for during classification. Text in this row should be read beginning with the phrase in the row heading to aid in clarity.

Photographs of Antarctic specimens have been used where possible to aid in the identification of VME groups. The guide has been linked through colour coding to phyla in the “Guide to common deepsea invertebrates in New Zealand waters” (Tracey et al. 2007), the SPRFMO VME taxa guide (Tracey et al. 2008), and the Field identification guide to Heard Island and McDonald Island (HIMI) benthic invertebrates (Hibberd and Moore 2009). Invertebrate specimens that cannot be identified with confidence need to be identified to the lowest taxonomic level possible, retained on board, and returned frozen as biological specimens for formal identification.



## Acknowledgments

CCAMLR, Convention for the Conservation of Antarctic Marine Living Resource which permitted SIOFA to adapt its original VME taxa guide.

Developers: S. Parker<sup>1</sup>, D. Tracey<sup>1</sup>, E. Mackay<sup>1</sup>, S. Mills<sup>1</sup>, P. Marriott<sup>1</sup>, O. Anderson<sup>1</sup>, K. Schnabel<sup>1</sup>, D. Bowden<sup>1</sup>, M. Kelly<sup>1</sup>, S. Lockhart<sup>2</sup>

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*Photographs:* Protected by copyrights either of National Institute of Water & Atmospheric Research Ltd, Land Information New Zealand, the New Zealand Ministry of Fisheries, the New Zealand Department of Conservation, the US Antarctic Marine Living Resources Program, or Peter Batson [www.deepseaphotography.com](http://www.deepseaphotography.com). Photographs were also contributed by CCAMLR fishery observers.

*Advice:* We thank international taxonomic experts in specifying useful characters for classification of several groups, including Stephen Cairns, Juan Sanchez, Dennis Gordon, Geoff Read, Shane Ahyong, Stefano Schiaparelli, and Ole Tendal. We also thank the CCAMLR VME workshop and FSA working group for their comments and suggestions to improve the guide.

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This document may be cited as:  
SIOFA VME Taxa Classification Guide. 4 p. (2021)

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## ANNEX E – PAEWG work plan

### Protected Area and Ecosystem Working Group Update Work Plan 2020-2023

According to SIOFA Scientific Committee  
Operational Work Plan 2019-2022 (Report 05 Annex I)

Theme	Research activities	Task	Timeline	Responsibility	PAEWG02 (2020)	PAEWG03 (2021)	PAEWG04 (2022)	PAEWG05 (2023)		
<b>1. Scientific data standards for the collection, reporting, verification and exchange of data</b>	<ul style="list-style-type: none"> <li>Review of observer data coverage requirements and observer data standards:</li> </ul>	<ul style="list-style-type: none"> <li>Collate background information to consider types and levels of observer coverage in relation to specific research, scientific committee work.</li> </ul>	<ul style="list-style-type: none"> <li>Data inventory to be completed prior to SC4 – inventory to be completed after submission of observer data and presented at SC5. Updated observer data inventory to be presented at SC6.</li> <li>PAEWG3 and SEAWG3 to provide advice on observer coverage requirements</li> </ul>	<ul style="list-style-type: none"> <li>Secretariat to provide inventory prior to SC6</li> <li>PAEWG and SERAWG to provide advice to SC6</li> <li>SC6 and CPs</li> </ul>						
<b>2. Advice on vulnerable marine ecosystems</b>	<ul style="list-style-type: none"> <li>Develop SIOFA definition of VME indicator species:</li> </ul>	<ul style="list-style-type: none"> <li>Consider VME indicator species identified in other relevant RFMOs or other bodies (e.g. CCAMLR, SPRFMO, etc.)</li> <li>Test whether these are appropriate for SIOFA area</li> <li>Development of pictorial guides to VME indicator species</li> </ul>				Done	<b>To be updated</b>			
	<ul style="list-style-type: none"> <li>Mapping of areas where VMEs are known or likely to occur. Work plan for taxa habitat mapping (SC4 Report, Annex I)</li> </ul>		<ul style="list-style-type: none"> <li>PAEWG2 and PAEWG3</li> <li>SC6</li> </ul>	<ul style="list-style-type: none"> <li>Consultancy commenced (2020)</li> </ul>		On going	<b>Final report</b>		<b>Funded</b>	
	<ul style="list-style-type: none"> <li>Bioregionalisation of the SIOFA area according to a spatial analysis approach. Work plan provided (SC4 Report Annex I)</li> </ul>		<ul style="list-style-type: none"> <li>PAEWG2 and PAEWG3</li> <li>SC6</li> </ul>	<ul style="list-style-type: none"> <li>PAEWG and consultant (Budget request)</li> </ul>				First report	Final report	<b>To be funded</b>
	<ul style="list-style-type: none"> <li>Consider benthic sampling protocol for mapping distribution of VME indicator species and predicting benthic community structure</li> </ul>		<ul style="list-style-type: none"> <li>SC6</li> </ul>	<ul style="list-style-type: none"> <li>France (Territories) to lead and report to SC for discussion</li> </ul>			On going			

	<ul style="list-style-type: none"> <li>Cumulative impact assessment of SIOFA fisheries:</li> </ul>	<ul style="list-style-type: none"> <li>Refine process to advance, given the disparate nature of information available.</li> <li>Undertake cumulative impact assessment for groups of fisheries/gear (eg orange roughly bottom trawling, long lining, Saya de Malha trawl) using a consistent methodology across the gear.</li> <li>Work plans updated at SC5 (SC5 Report, Annex I)</li> </ul>	<ul style="list-style-type: none"> <li>SC4 – report on progress on cumulative impact assessments for fisheries/gears – work plans developed to progress cumulative assessment of trawls and longline gear (SC4 Report, Annex T)</li> <li>SC5 – updated work plans (Annex I)</li> <li>SC6</li> </ul>	<ul style="list-style-type: none"> <li>Relevant CPs to progress cumulative impact assessments, including data provision, agreement on methods and implementation ; longline (Australia, EU, France(Territories), Japan, Korea), trawling (Australia, Cook Islands, Japan, Thailand)</li> <li>PAEWG3 to review and monitor progress Intersessionally</li> <li>Review of cumulative impact assessments by SC6</li> </ul>		On going	<b>Final report</b>		<b>Funded</b>
	<ul style="list-style-type: none"> <li>Consider proposals for protected areas against the Standard protocol</li> </ul>		<ul style="list-style-type: none"> <li>As per process in PAEWG ToR</li> </ul>	<ul style="list-style-type: none"> <li>Proposals from CPs</li> <li>PAEWG and SC</li> </ul>					
	<ul style="list-style-type: none"> <li>Review of trawl fisheries threshold levels for VME encounters</li> </ul>		<ul style="list-style-type: none"> <li>SC6</li> </ul>	<ul style="list-style-type: none"> <li>Relevant CPs (Australia, Cook Islands, Japan and Thailand)</li> <li>PAEWG3</li> </ul>	On going	On going			
<b>3. SIOFA historical bottom fishing footprint</b>	<ul style="list-style-type: none"> <li>Spatial extent of historical and current fishing – SC5 specified the maps to be generated by the Secretariat and the work plan</li> </ul>		<ul style="list-style-type: none"> <li>SC4 reviewed Secretariat's data inventory describing the spatial resolution of the historical fishing effort data that has been submitted.</li> </ul>	<ul style="list-style-type: none"> <li>Secretariat and PAEWG</li> </ul>		On going			